MTI Report 02-06

# Saving City Lifelines: Lessons Learned in the 9-11 Terrorist Attacks

M T I

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# *MINETA TRANSPORTATION INSTITUTE*

The Norman Y. Mineta International Institute for Surface Transportation Policy Studies (MTI) was created by Congress through the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and established in the California State University system at the San José State University College of Business. MTI continues as a University Transportation Center (UTC), reauthorized in 1998 by the Transportation Equity Act for the 21st Century (TEA-21).

MTI is unique among UTC's in two areas. It is the only center with an outside, internationally respected Board of Trustees, and it is the only center located in a College of Business. The Board provides policy direction, assists with needs assessment, and connects the Institute and its programs with the international transportation community. The Institute's focus on policy and management resulted from a Board assessment of the industry's unmet needs and led directly to the choice of the San José State University College of Business as the Institute's home. MTI applies the focus on international surface transportation policy and management issues in three primary areas:

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The Institute aims to provide policy-oriented research for all levels of government and the private sector, to foster the development of optimum surface transportation systems. Research areas include: security of transportation systems; planning and policy development; interrelationships among transportation, land use, the environment, and the economy; financing of transportation improvements; and collaborative labor-management relations. Certified Research Associates conduct the research. Certification requires an advanced degree, generally a Ph.D., a record of academic publications, and professional references. Research projects culminate in publication available both in hardcopy and on the Institute's website.

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**Information and Technology Transfer**
MTI's third responsibility is to develop and maintain electronic information systems to store, retrieve, and disseminate information relating to surface transportation policy studies. The Institute's website, *TransWeb,* enables transportation professionals, students and individuals worldwide to access information relating to surface transportation research and policy. *TransWeb* is found at http://transweb.sjsu.edu and delivers regional, state, national, and international transportation information. The Institute also maintains a library of periodicals and other unique publications for transportation research in cooperation with the San José State University Library system. MTI is funded by Congress through the United States Department of Transportation Research and Special Programs Administration (RSPA), the California Legislature through the Department of Transportation (Caltrans), and by private grants and donations.

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September 2003

**Brian Michael Jenkins**
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In this report, the Mineta Transportation Institute (MTI) counterterrorism team undertakes a case study of the 2001 events to determine what lessons could be preserved in a comprehensive document. The scope was limited to the evaluation of transit response, not other surface transportation elements such as bridges and tunnels, which seemed to function quite well and could be the subject of an additional MTI study. This is a continuation of work begun by MTI in 1996, a program that has included two national symposia, two California statewide symposia, two volumes of case studies, a chronology of attacks on surface transportation from 1920 through 2000, and an Executive Overview that includes a best practices checklist.

Due to the magnitude of damage to and involvement by the New York City transit agencies, the report focuses primarily on that city's experience. The systems that were affected directly or indirectly and the responding emergency agencies are addressed with regard to prior preparations, the immediate events on September 11, and subsequent alarms. The study includes crisis management, security, and restoration of service.

This report is not an audit of performance, but a distillation of lessons learned for use in planning response to future terrorist attacks or natural disasters. Lessons learned fell into three broad categories: command and control, planning, and planning, training, and exercises (PTE).

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# FOREWORD

In this report, the Mineta Transportation Institute (MTI) counterterrorism team undertakes a case study of the 2001 events to determine what lessons could be preserved in a comprehensive document. The scope was limited to the evaluation of transit response, not other surface transportation elements such as bridges and tunnels, which seemed to function quite well and could be the subject of an additional MTI study. This is a continuation of work begun by MTI in 1996, a program that has included two national symposia, two California statewide symposia, two volumes of case studies, a chronology of attacks on surface transportation from 1920 through 2000, and an Executive Overview that includes a best practices checklist.

Because of the magnitude of damage to and involvement by the New York City transit agencies, the report focuses primarily on that city's experience. The systems that were impacted directly or indirectly and the responding emergency agencies are addressed with regard to prior preparations, the immediate events on September 11, and subsequent alarms. The study includes crisis management, security, and restoration of service.

This report is not an audit of performance, but rather a distillation of lessons learned for use in planning response to future terrorist attacks or natural disasters. The research team interviewed many transit authorities and public officials, poured over plans made prior to the events and reports completed after, and reviewed all publicly available literature.

What emerged from this investigation was a clear sense that public transit agencies were the unsung heroes of the 9-11 attacks. From their role in saving passengers' lives and evacuating Lower Manhattan to delivering rescue workers and heavy equipment to Ground Zero and providing communications capacity, the transit agencies played a vital role in rescue and recovery work. Heroic efforts resulted in system repairs and the establishment of new service in fractions of the usual required time, greatly assisting New York's economic recovery.

The Mineta Transportation Institute is proud to present this record of the valiant efforts made by public transit agencies and emergency operations personnel and the lessons learned during the 9-11 attacks and subsequent recovery.

Rod Diridon, Sr.
Executive Director

# EXECUTIVE SUMMARY

This case study of the September 11, 2001, terrorist attacks examines how the Metropolitan Transportation Authority, New York City Transit, Port Authority, and other transit systems responded to the events of 9-11, and how the Office of Emergency Management (OEM) worked to coordinate response and recovery operations; it also seeks to identify those lessons that can be captured before participants rotate or retire, memories dim, and what was learned is lost.

The scope was limited to the evaluation of transit response, not other surface transportation elements such as bridges and tunnels. This report is a continuation of the transportation security work begun by MTI in 1996, a program that has included two national symposia, two California statewide symposia, two volumes of case studies, a chronology of attacks on surface transportation from 1920 through 2000, and a best practices checklist. This report is not an audit of performance, but rather a distillation of lessons learned for use in planning response to future terrorist attacks or natural disasters.

Because of the magnitude of damage to and involvement by New York City transit agencies, the report focuses primarily on that city's experience. The research team conducted many interviews with transit authorities and public officials, poured over plans made before the events and reports completed after, and reviewed all publicly available literature. The systems that were impacted directly or indirectly and the responding emergency agencies are addressed with regard to prior preparations, the immediate events on September 11, and subsequent alarms.

Unforeseen developments, communications failures, and moments of confusion following the 9-11 attacks complicated response efforts, but overall, the managers and employees of New York's transportation system performed with extraordinary effectiveness—indeed, with heroism. The scale of the 9-11 attacks meant that authorities had to operate in uncharted territory and devise ad hoc responses. There is no question that lessons were learned, but much of the response reflected existing emergency planning, exercises, and training: crisis-management simulations, full-scale exercises, and regular practice drills. Previous terrorist incidents and threats had focused New York City's attention on crisis management.

The report's major conclusion is that New York's transportation network worked as well as it did on September 11 because city and transportation authorities had taken an all-hazards approach to emergency preparedness, recognized the threat of terrorism, and continued the effort to prepare and practice for possible terrorist attacks.

The following are some of the lessons learned during the course of the investigation. The complete list begins on page 47.

## LESSONS LEARNED REGARDING COMMAND AND CONTROL

- Keeping the public informed requires a multimedia, high-volume effort. Deploying administrative staff to be front-line public information officers was especially effective during the 9-11 crisis and would be essential in cities where the population is not accustomed to using public transportation. The emergency public information function is an essential element of the National Incident Management System (NIMS), established by Homeland Security Presidential Directive/HSPD 5 on February 28, 2003.
- Even with current improvements in the intelligence-sharing function, transportation operators cannot depend on timely warning of attacks. Operators can improve their situation somewhat by maintaining close liaison with police and federal authorities through NIMS planning/ intelligence activities.
- Security considerations and traffic control may necessitate restrictions on private automobile use for months after a terrorist attack. Increased use of public transportation should be anticipated.
- Recovery planning may have to be compressed into days, sometimes hours. This, in turn, requires the flattening of hierarchies. This is a lesson of both the 1993 World Trade Center bombing and the 9-11 attacks.
- The destruction of the World Trade Center wiped out or prevented access to crisis plans, documents, and drawings necessary for response and reconstruction. To ensure continuity of business and rapid recovery, copies of vital documents should be cached at several locations and should also be available online at secure, password-protected websites.
- Victim family notification is a key function that needs enhancement. Transit agencies should develop their own NIMS-based plan to respond to transit-based events.

## LESSONS LEARNED REGARDING PLANNING

- Public transportation played a key role in evacuating Lower Manhattan and Washington, D.C. Chemical, biological, or radiological attacks and natural disasters such as hurricanes and earthquakes also may require large-scale evacuations. The evacuation effort in New York was successful because the transit operators had thought about it and planned for it.
- The MTA's role in transporting emergency personnel to Lower Manhattan was unanticipated, but could become a necessity in other situations and should be planned for.
- Because transportation operators had specialized heavy equipment for construction, maintenance, and emergency response, the MTA played a critical role in the rescue effort at Ground Zero and in helping restore parts of the city's infrastructure, including communications. City officials and transportation operators should look at these assets as essential resources in dealing with all hazards and ensure coordination across department lines within city government.

- Redundant multimodal communications are essential. The 9-11 attack wiped out telephone lines and destroyed fiber-optic lines and antennas; the cellular system was overloaded. The MTA's redundant systems enabled it to communicate and to assist other city entities in communicating. Future planning should include the development of communications failure protocols as part of the overall emergency operations plan for all hazards.

## LESSONS LEARNED REGARDING PLANNING, TRAINING, AND EXERCISES

- The single most important lesson of 9-11 is the importance of crisis planning and frequent response exercises, both tabletop simulations and field exercises. The City of New York and its public transportation system responded remarkably well on 9-11 despite the loss of emergency operations centers, the inaccessibility of vital documents, and communications difficulties, because they had devoted continuing attention to crisis management planning and exercises.
- Crisis plans, once completed, cannot be put on the shelf to gather dust, but must be periodically reviewed and updated. Exercises should be conducted frequently.
- Response plans can be adapted to different circumstances. Plans for natural disasters and contingencies addressed in tabletop exercises were applied to new circumstances on 9-11. Similarly, plans and exercises focused on response to terrorist attacks will apply to other kinds of disasters.
- Emergency operations centers (EOC) may be destroyed or rendered inaccessible in a major catastrophe. Alternative sites should be identified and prepared in advance. While EOCs might be lost or impaired, knowledge acquired and networks built on personal relationships created in exercises will survive.

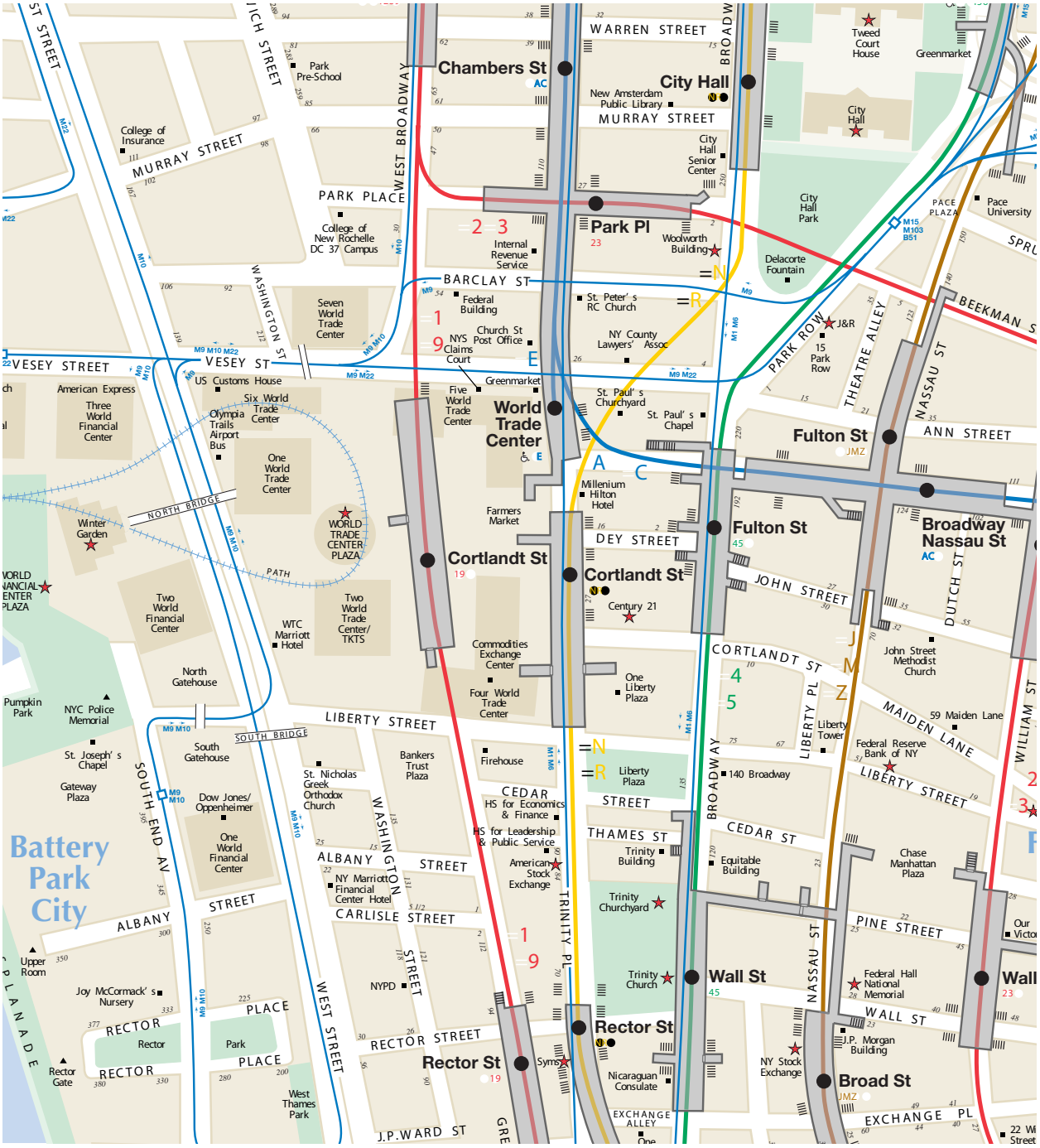


**Figure 1. MTA NYC Subway Map—Lower Manhattan**

**Map © Metropolitan Transportation Authority. Used with Permission. Unauthorized reproduction prohibited. Single copies may be made for personal use only. The Subway map is effective 9-11-01 and is not a current version of the subway map.**

# INTRODUCTION

The death and destruction caused by the terrorist attacks on September 11, 2001, have no precedent in the annals of terrorism. The devastation in New York City was comparable to that caused by war or catastrophic natural disasters. Like wars and natural disasters, 9-11 was a story about moving people—not fleeing refugees or troops moving to the front, but tens of thousands of people who fled the lower portion of the city, while hundreds of thousands raced to get out of Manhattan entirely. At the same time, thousands of emergency personnel had to get into the city to assist in rescue efforts and maintain security. Emergency and construction vehicles had to be moved to Ground Zero, as the site of the World Trade Center (WTC) quickly came to be known. When the city's transit stations and tunnels were damaged by the collapse of the World Trade Center towers, and its vehicular tunnels and bridges were shut down for security reasons, the huge, complex public transportation system became its lifeline. If the system had failed under the pressure, as the towers themselves did, panic and chaos could easily have ensued. With the entire nation watching in ever greater horror, alarm could have spread across the country.

But the transportation system did not collapse. Civilians were moved out of harm's way, and emergency personnel were moved in. In addition to its normal duties, New York's Metropolitan Transportation Authority (MTA)[1] mobilized its redundant transportation capacity. When the subway service to Lower Manhattan was suspended in the aftermath of the attack, MTA could enlist New York City (NYC) Bus and Paratransit to move civilians from Lower Manhattan and emergency responders to locations around Ground Zero where they were needed for rescue and security duties. MTA also had its own armada of specialized heavy equipment and personnel to assist in the rescue effort.

Moreover, the MTA assisted in maintaining communications among city authorities whose communications network had suffered physical damage, and it provided vital information about the situation and updated instructions to a remarkably resilient public.

The situation was somewhat different in the nation's capital. Although one of the hijacked aircraft struck the Pentagon, the damage to the civilian community there was less, the death toll was much lower, and the site of the attack was on the city's edge. Still, offices shut down, buildings were emptied, and workers were evacuated on the city's buses and Metro system. Washington, D.C., is a less densely occupied city than Manhattan, with broader streets, more open space, and water blocking access only to the Virginia side, so people there had more ways out. Therefore, this report focuses on the more complex experience of New York City. Where appropriate, however, it also includes references to the situation in Washington.

[1] The MTA comprises the Long Island Rail Road, Metro-North Railroad, New York City Transit (subways and buses), Long Island Bus, and Bridges and Tunnels.

This report is based on published accounts, after-action reports, and briefings, supplemented with interviews with the key officials who were involved in the events of 9-11 and the days that followed. While the focus is on transportation, a consideration of broader emergency management issues is included for context.

The report is not an evaluation of performance. Its sole purpose is to distill lessons learned. As in battle, unforeseen developments, communications failures, and moments of confusion following the 9-11 attacks complicated response efforts, but overall, the managers and employees of New York's transportation system performed with extraordinary effectiveness—indeed, with heroism. The report examines how the Metropolitan Transportation Authority, New York City Transit, Port Authority, and and other transportation systems responded to the events of 9-11, and how the Office of Emergency Management (OEM) worked to coordinate response and recovery operations; it also seeks to identify those lessons that can be distilled before participants rotate or retire, memories dim, and what was learned is lost. Indeed, that is already occurring. It is remarkable how quickly those who were involved in the events of 9-11 have retired or left for other jobs. In less than two years, much of the experience gained on September 11 and in the following weeks has already been dispersed. This underscores the need to preserve as many of the lessons as possible.

The scale of the 9-11 attacks meant that authorities were obliged to operate in uncharted territory and to devise ad hoc responses. There is no question that lessons *were* learned, but much of the response reflected existing emergency planning, exercises, and training: crisis-management simulations, full-scale exercises, and regular practice drills. Previous terrorist incidents and threats had focused New York City's attention on crisis management. In fact, the report's major conclusion is that New York's transportation network worked as well as it did on September 11 because city and transportation authorities had taken an all-hazards approach to emergency preparedness, recognized the threat of terrorism, and continued the effort to prepare and practice for possible terrorist attacks.

Although the crisis obviously started on September 11, it did not end the next day. In the following weeks and months, transportation operators had to deal with the consequences: numerous threats and hoaxes, along with the need to implement heightened security measures and a new national alert system created by the newly established Department of Homeland Security. New York and Washington, D.C., considered by terrorist analysts and government officials as the two most likely targets of further terrorist attacks, maintained a higher level of security than did the rest of the country. Growing concerns about the possible deliberate dispersal of chemical, biological, even radiological substances, especially in the wake of the anthrax letters sent in the fall of 2001, further complicated security.

This report should be seen as part of a continuing effort to assist government officials and public transportation operators in developing security and crisis-management strategies. Since 1996, the Mineta Transportation Institute has conducted research on the ways surface transportation

officials and operators have dealt with the aftermath of terrorism and serious crime, focusing on lessons learned from major terrorist assaults. Published case studies include the 1995 sarin attack on Tokyo's subways, the 1995 sabotage of Amtrak's Sunset Limited, the 1995-1996 terrorist bombing campaign against the Paris Metro and rail system, and the Irish Republican Army's (IRA) 25-year terrorist campaign against London's Underground.[2]

[2] See Norman Y. Mineta International Institute for Surface Transportation Policy Studies, *Terrorism in Surface Transportation: A Symposium*, San Jose, CA: Norman Y. Mineta International Institute for Surface Transportation Policy Studies, 1996; Brian Michael Jenkins, et al., *Protecting Surface Transportation: Systems and Patrons from Terrorist Activities: Case Studies of Best Security Practices and a Chronology of Attacks*, San Jose, CA: Norman Y. Mineta International Institute for Surface Transportation Studies, 1997; Brian Michael Jenkins and Dr. Larry N. Gerston, *Protecting Public Surface Transportation Against Terrorism and Serious Crime: Continuing Research on Best Security Practices*, San Jose, CA: Mineta Transportation Institute, 2001; and Brian Michael Jenkins, *Protecting Public Surface Transportation Against Terrorism and Serious Crime: An Executive Overview*, San Jose, CA: Mineta Transportation Institute, 2001.

# PREPARATIONS PRIOR TO SEPTEMBER 11

Prior experience gave New York's transportation authorities ample reason to be prepared for terrorist attacks. As host to the United Nations and its vast diplomatic community and home to immigrants from all over the world—some of whom did not leave the quarrels of their homelands behind—New York City presents numerous readily available targets to a variety of possible antagonists. It has been, historically, the site of previous terrorist attacks. Of all the metropolitan areas in the United States, New York has had the most experience dealing with a major terrorist threat.[3]

The 1993 bombing of the World Trade Center, although not the deadliest terrorist attack in the city's history, was the most ambitious, including a secondary explosive device intended to harm first responders, and caused great alarm. The terrorists clearly intended to bring down the towers, and some people believe they came close to doing so. Six people died in the explosion, and thousands were injured, primarily by smoke. Damage was extensive. The New York subway and Port Authority Trans Hudson (PATH) train stations under the towers were badly damaged. Subsequent threat assessments concluded that a second terrorist attempt on the World Trade Center was likely, although no probabilistic estimate was offered. The possibility, albeit remote, of terrorists deliberately crashing a plane into the towers was even included in the spectrum of possible threats.[4] Fears of further attacks were heightened later that year, when authorities uncovered a plot to carry out multiple large-scale bombings at city landmarks, including bridges and tunnels.

The experience gained in the 1993 attack and the subsequent foiled plot prompted city and transportation officials to review their emergency plans and to devote greater attention to crisis response.

Additional incidents kept transportation officials focused on the threat of violence against transit vehicles and passengers. In December 1993, a mentally disturbed man shot and killed six commuters on the Long Island Rail Road. Nineteen others were injured in the attack, and passengers sitting next to victims were trapped in their seats for hours, supporting the victims while they waited for emergency medical personnel to arrive.

[3] Statistics compiled by the RAND Corporation indicate that New York leads U.S. urban areas in the number of terrorist attacks.

[4] In 1993 Kroll Associates, an investigative and security consulting firm headquartered in New York, was asked by the Port Authority of New York and New Jersey, the owner and manager of the World Trade Center at the time, to assist it in dealing with the aftermath of the terrorist bombing that took place in February of that year and to help design new security measures. This report's Principal Investigator, Brian Michael Jenkins, was then Deputy Chairman of Kroll and led the analysis of future terrorist threats and how they might be addressed.

In March 1994, a Lebanese cab driver opened fire on a van carrying Hasidic Jews on the Brooklyn Bridge. One person was killed, and three were wounded. In December 1994, an extortionist planted two firebombs on downtown New York subways, injuring 53 people. In February 1997, a lone Middle Eastern gunman opened fire on the observation deck of the Empire State Building. The attack left two dead (including the gunman) and six injured. Later in 1997, police uncovered a plot to carry out suicide bombings on New York's subways. The two would-be attackers had already prepared the explosives. Although not all of these incidents fell into the category of terrorism, nor did they all directly affect public transportation facilities, they underscored the reality of the terrorist threat and provided transportation operators with additional experience in evacuating injured passengers, rerouting trains, working with police and fire crews, and providing information to the public.

At the city level, in 1996 the Office of Emergency Management was created to develop citywide emergency plans and coordinate the work of all city departments in responding to a community-wide emergency event. Personnel were drawn from police, fire, emergency medical services, and other city departments.

The Metropolitan Transportation Authority also merged the police departments of its member transit organizations, providing a vehicle for coordinated security planning and emergency preparedness with all operating agencies. The new MTA Police Department established an Emergency Management Office and developed a mission and methodology for effective crisis management and business continuity. It had the following goals:

1. Establish a liaison and working relationship with all local, city, and state emergency planning groups that the transportation network serves.
2. Create a coordinated emergency planning group consisting of representatives from all the MTA agencies and create an Emergency Operations Center (EOC) to support this work.
3. Identify independent agency resources and create a combined data resource list indicating all the agencies' resources.
4. Conduct emergency exercises with local governmental agencies and local emergency management planning groups.
5. Conduct training with all MTA agencies and provide some common guidelines for emergency operations.
6. Establish an intelligence network on the local, national, and international levels to prepare for criminal and terrorist attacks against any MTA facility or operating agency.
7. Conduct risk assessments and vulnerability analyses for all agencies and recommend security systems to protect the transportation infrastructure.[5]

[5] Capt. Ernest H. Pucillo, MTA Police Department, Review comments, August 8, 2003.

A timely MTA crisis-management review kept the focus on preparedness. This review, initiated in 1997, examined the relevant emergency response plans of all of MTA's operating entities for their applicability to a major terrorist attack, and it identified ten critical crisis-management issues that had come up repeatedly in similar events. MTA officials ranked the critical issues as follows:

- Service disruption and damage containment
- Safety and security
- Perceptions of victim and family support
- Communications and media management
- Contingency planning
- Restoration of passenger confidence
- Litigation issues
- Lessons learned
- Political fallout
- Financial consequences

The Incident Command System (ICS) was not being used by MTA in its crisis response planning.

The placement of service disruption ahead of safety and security is misleading. First, in the overall scoring, the difference between the two was negligible, and second, combining safety and security colored the result. Transportation officials fully accept responsibility for safety but see security as a domain of shared responsibility involving agencies and resources beyond their control—especially in dealing with a threat such as terrorism. As these officials see it, transportation operators keep the system running; others must deal with terrorists.

In 1997, each of the operating divisions of the MTA had its own set of crisis-management plans, and the MTA's overall role in crisis management was not well defined. Generally, MTA officials supported whatever operating divisions were involved in the crisis. With the merger of the Metro-North and Long Island Rail Road police departments, the new MTA Police Department took the lead for security and crisis management. After 9-11, the MTA decided to play a more central role by creating a Director of Security who would outrank the division heads, thereby ensuring cooperation.

# THE EVENTS OF SEPTEMBER 11, 2001

## THE FIRST MOMENTS AFTER THE ATTACK

At the beginning of September 2001, 60,000 people worked at New York's World Trade Center; 90,000 people visited the center on any given day to do business, buy theater tickets, stand on the observation platform atop Tower 2, or eat in the famous Windows on the World restaurant under the television antenna of Tower 1.

At 8:46 A.M. on September 11, the people who worked in the towers were starting to arrive at work. Although the bond firms and international bankers came in early to get a jump on the market, most businesses in the World Trade Center opened at 9 A.M. At 8:46 A.M., people were stopping to buy a newspaper, a cup of coffee, or a snack to take to work. This was also a primary election day for New York City, and many people were late for work because they stopped to vote, a fact that doubtless saved thousands of lives.

Commuter traffic also was a problem for people on that morning. The tunnels into the city seemed slower than usual, and workers on their way to their offices at the World Trade Center worried that they would be late. The snarled traffic saved more lives; many commuters heard about the attacks while they sat in their cars.

September 11 was going to be a busy day at the OEM. Staff members arrived early to prepare for Operation Tripod, an exercise that would test the plan to distribute antibiotics to the entire city population during a bioterrorism attack. The exercise was planned for September 12, with police and fire department cadets to be used as the simulated civilian population. Pier 92 was set up as a model distribution station where the "victims" of the mock attack who needed to receive antibiotics would be treated.

The OEM staff heard a plane fly over their building, an unusual sound at that location, then they heard a popping noise. The kevlar-lined walls of the Emergency Operations Center deadened the sound of the plane crashing into the 110-story North Tower, directly across from the OEM offices in World Trade Center Building 7. When the building shook at 8:46, New York City Police Department (NYPD) Inspector John Odermatt, OEM's Commissioner, thought the event might have been a freak accident involving a ground-to-air missile. OEM staff members began to open the Command Center on the twenty-third floor, but moments later, they received a message that an airplane had hit the North Tower. From their window, the OEM staff could see the fireball and could see people running from the building, as paper floated through the air. At 9:03, a second plane hit the South Tower. Forty minutes later, a third plane struck the Pentagon. The nation was under attack.

## COLLAPSE OF THE TOWERS

Building 7 housed not only the OEM and its EOC, but other government agencies as well. The Central Intelligence Agency (CIA), the Drug Enforcement Administration (DEA), the Federal Bureau of Investigation (FBI), and the Bureau of Alcohol, Tobacco and Firearms (ATF) were among the tenants. The building had its own power supply and private building security, and it had been built to be resistant to floods and storms. As the North Tower collapsed, federal staff members were laboring to remove boxes of contraband and other evidence for safeguarding.

The OEM had its own dispatch center that monitored all the frequencies used by New York City agencies. The center was used for personnel callbacks from the assigned staff of 104 people and for staffing the phone bank. Because the OEM did not have its own budget, its staff was provided by various city agencies, principally the NYPD, its original home department. As OEM staff began calling in from all over the city, the sound of the second plane striking Tower 2 was heard by dispatch center staff over their radio. This attack caused the internal alarms in Building 7 to activate, warning that there was no water pressure and that the emergency generator had been activated.

OEM staff immediately called for air security over New York City. The Federal Aviation Administration (FAA) directed the OEM to use NYPD and Port Authority Police Department air assets to clear the airspace around the World Trade Center. OEM was assured that federal support was on its way but also was warned that Kennedy Tower was reporting an unaccounted-for airplane heading for New York. This was the plane that ultimately crashed in Pennsylvania. At 9:17 A.M., the FAA shut down New York City's three commercial airports; at 9:40 A.M., it grounded all flights in U.S. airspace.

The OEM staff was ordered to evacuate Building 7 immediately as a precaution, but interview sources indicate they did not initially respond with a sense of urgency. They calmly collected personal belongings and began removing OEM records, but they were urged to abandon everything and leave the building quickly. Those interviewed believe that order saved their lives.

The OEM staff now had to develop responses to what had shortly before seemed unthinkable. As they dispersed to other locations, they observed people jumping to their deaths from the floors of the tower above the fire.

People inside the South Tower felt the floor vibrate as if a small earthquake were occurring. Instinctively, they sought shelter behind the massive pillars in the lobby, then everything went black. The vibration lasted for about 30 seconds. The doors were knocked out, and a huge ball of flame created by the exploding diesel fuel from the building's own supply tank shot from the elevator shaft and out the doors of the South Tower, consuming everything in its path. Minutes later, at 9:59 A.M., the tower collapsed.

Fortunately, the NYPD Command and Control Center was operational. MTA sent representatives to maintain continuity of communications. Almost immediately, the MTA representatives began coordinating the provision of buses to move military personnel and provide temporary shelters. Personal relationships developed during prior emergencies enhanced interagency coordination.

The Port Authority of New York and New Jersey had representatives at the NYPD Command and Control Center, and activated its own Emergency Operations Center (EOC). It also sent representatives to the NYC OEM in its temporary location.

# CHALLENGES TO TRANSPORTATION OFFICIALS

## THE ABSENCE OF CENTRAL COMMAND

Fast-moving events, the destruction of the operations centers at the World Trade Center, and communications difficulties meant that the initial response had to begin before central direction and control could be established. Those on the scene in the first critical minutes relied on what they had learned in earlier training and drills. Decision making was dispersed. Interviewed sources stated that, since the 1980s, the MTA had maintained a policy of empowering its employees to make decisions. On September 11, station managers and train drivers became front-line commanders.

No security measure that public transportation operators could have taken could have prevented the attack. However, the serious attention they had paid to the threat of terrorism and crisis management preparedness was key to saving lives and avoiding panic. New York City Transit went to emergency operations one minute after the first plane hit; PATH did so within six minutes. Hundreds of buses were dispatched as a "rescue brigade" to move people uptown from the WTC area.

One senior Port Authority police officer at the scene described the situation at the World Trade Center as being like Omaha Beach on D-Day. It made little difference whether the radios worked or not. Communications were impossible in the chaos at the scene, so people did what they had been taught to do in drills. Training was critical. A report later commissioned by the NYPD to review its performance on 9-11 was critical of police response but gave high marks to the transit police who had received specialized training in disaster response.[6]

## ESTABLISHING ALTERNATIVE EMERGENCY OPERATIONS CENTERS

The destruction of the OEM's EOC and the scramble to set up alternative command posts delayed the centralized coordination that had been practiced, but the network built on personal relationships established in the drills survived. Interviewed sources stated that officials were able to overcome the loss of the OEM EOC because they knew one another, had worked together, and were empowered to manage the emergency through preplanned strategies. The success of this effort underscored the fact that emergency response, like reactions in battle, cannot depend on central command hierarchies, but must be based on coordinated planning for crises and their consequences. Personal cell phones and makeshift equipment enabled MTA to maintain communications with OEM and other critical partners in the rescue and response effort's earliest hours.

[6] McKinsey & Company, *Improving NYPD Emergency Preparedness and Response,* August 19, 2002.

The same was true during the restoration and reconstruction phases. Deep hierarchies and long planning cycles simply would not work. What normally took months had to be done in days. As was the case in the aftermath of the 1993 World Trade Center bombing, rapid recovery required delegating more authority down the line to get things done.

OEM staff members requested the OEM command bus, with its radios, computers, and even a portable weather station, for use as a mobile emergency operations center. The new EOC at the World Trade Center had been built with redundant systems and independent power supplies. Emergency planners had relied on internal redundancy to store emergency plans and vital records, but those records and plans were now inaccessible. With the evacuation of Building 7, copies of the city's emergency operations plans had to be retrieved from other agencies and from personal storage, which required some time. Fortunately, the well-trained OEM staff members were able to implement their emergency action plans from memory and combined knowledge.

After a head count of OEM staff on the bus, the mobile command center was dispatched to Sixth Avenue and 36th Street, near the corner fire station, with Mayor Rudy Giuliani, OEM Commissioner John Odermatt, and the fire and police commissioners present.

## RESTORING OEM'S FUNCTIONS

There were continuing moments of alarm. A panel truck with a painting of a plane flying into the World Trade Center was stopped near the temporary command post. It proved to be rented to a group of ethnic Middle Eastern people who did not speak English. Fearing that it might be a truck bomb, the NYPD immediately evacuated the area, called out the bomb squad, and detained the occupants until a thorough search was made. The vehicle was found to be an innocent delivery truck.

A plan was developed to reestablish OEM's functions at an alternate EOC located in the library of the Police Academy on East 20$^{th}$ Street, but this space was quickly outgrown. Because Pier 92 had already been set up for the September 12 exercise, OEM staff members moved there and quickly converted the space into a large EOC adequate to support the complex tasks of managing the nation's largest catastrophic building collapse. In 31 hours, OEM staff had a functional facility just over 4 miles north-northwest of the WTC.

Ultimately, 175 agencies were represented at Pier 92. Each agency had its own emergency response plan, but not all the plans were integrated. There was a Federal Emergency Management Agency (FEMA) representative at Pier 92, but FEMA also took over Pier 90 for its own EOC; Pier 94 became the family assistance unit, where the American Red Cross set up shop.

The MTA Police also coordinated with EOCs all over the metropolitan area that had jurisdictional responsibility over the system assets or could provide logistical support to the transit agencies and

first responders. MTA was represented at the Nassau County OEM, Suffolk County OEM, Westchester County OEM, State OEM at the Albany command center, NYC OEM, and NYPD Command and Control. Thus the MTA provided a redundant capacity for communication among local agencies, enabling statewide coordination of resources and intelligence for the MTA in all the geographical areas served.

The Pier 92 EOC not only was a work site but also had 50 beds for staff members who could not get home, and the facility served more than a thousand meals each day. The pier was protected by a Coast Guard patrol, and cement barges were positioned to protect working areas from access from the water. The Jacob Javits Center served as headquarters for Urban Search and Rescue Teams (including the search dogs), Disaster Medical Assistance Teams, Disaster Mortuary Teams, and Veterinary Medical Assistance Teams arriving from across the United States. These teams were deployed by FEMA as part of the Federal Response Plan to support New York City's own emergency responders.

# IMPACT ON THE TRANSIT SYSTEM

The World Trade Center had eight below-grade levels, including a two-level shopping complex and three levels of parking spaces and stations for PATH trains from New Jersey, commuter trains, and subways. NYC Transit's N/R line had stations adjacent to the World Trade Center complex, and line E terminated at the WTC station. the 1/9 station was below the plaza between the twin towers. The 1/9 line runs down Greenwich Street and used to pass under Building 7 and beneath the plaza between Towers 1 and 2. Every day, thousands of commuters passed through these transit points on their way to work.

When the first tower was hit on September 11, the official in charge of PATH operations immediately became concerned for the safety of passengers and equipment. She ordered all PATH trains to proceed to the end of the line and stay there, and she stopped additional trains from leaving their New Jersey stations. The PATH trains normally entered directly under the World Trade Center concourse between Towers 1 and 2. (The PATH track is still visible in the cleared pit area.) The PATH escalators and underpass were below the 1/9 line tracks, and the 1/9 tunnel was built over the original PATH tubes to the old Hudson and Manhattan station at Church Street. Completed in 1918, the tunnel had less than 10 feet of dirt above it, and the base of the rail was approximately 10 feet below groundwater. A slurry wall had been built prior to the construction of the World Trade Center to prevent settlement of the subway during construction.

When the first plane hit the North Tower, NYC Transit had 230 trains carrying approximately 200,000 passengers in Lower Manhattan; 60,000 of the passengers, along with 300 employees, were in the immediate vicinity of the World Trade Center, according to interviewed sources. NYC Transit dispatchers, hearing of the plane crash, activated their emergency plans. One train was approaching Cortland Street when the driver received word of the crash from the operations center. He moved rapidly through the station and pulled the train and its passengers to safety. Other trains were rerouted or held back from the damaged area. All NYC Transit buses and subways proceeded down the line, bypassing the World Trade Center stations, according to plan. Prompt action prevented loss of life. Primarily because of rapid evacuation, NYC Transit sustained not one employee or customer fatality.

In the crucial first moments after the first plane hit, NYC Transit subway trains were ordered to bypass all World Trade Center locations, pending police investigation of the apparent accident. Line superintendents were dispatched to the World Trade Center stations, while the police closed the Cortland Street station as a precaution because of its proximity to the accident scene. NYC Transit personnel walked the tracks and tunnels in the areas near the World Trade Center to ensure the complete evacuation of all stations and tunnels. No commuters were lost in the transit levels of the World Trade Center when the towers fell, even though the stations were damaged and the 1/9 line was ruined.

According to NYC Transit's longstanding plan for emergencies, all trains were to go to the closest station and evacuate passengers and crew, pending fire department response and NYC Transit evaluation. Because the New York subway system has surface ventilation, the station was to be used as a safe zone. During an accident some years before, NYC Transit discovered that the operation of the generators caused the temperature to rise to over 120 degrees even in the ventilated areas. Subsequently, fans were added to increase the movement of air from the outside, and workers were given headlights to enable them to use their hands for response work. These infrastructure improvements facilitated the subway search.

Excavation of the site of the World Trade Center had required the removal of 1.2 million cubic yards of dirt. The dirt had been placed as fill on the margins of the island, creating Battery Park Center, a new area for housing and commercial buildings. However, the lower portions of Manhattan south of Canal Street are below the waterline in many areas. Therefore, when the World Trade Center was built, a wall was created to protect the city from the encroachment of water. Some of this protective infrastructure was lost in the collapse of the towers. The tracks and tunnels of the 1/9 line were flooded in places, and NYC Transit was forced to stop service in Lower Manhattan while it evaluated the damage.

NYC Transit had offices at 2 South Broadway, just east of the damaged area. To staff working there, the collapse of the towers felt like an earthquake. Dust and debris from the collapse covered the building, causing the headquarters facility to be closed for one week. There was neither electricity nor phone service in the area, and the dust compromised the building's ventilation system. Bowling Green Park and Battery Park nearby were like military zones, filled with first responders.

The subway train control center at 370 Jay Street in Brooklyn ordered all trains halted until the situation could be evaluated. Physical damage from the collapse and vibrations, and flooding of some track, had put the N/R trains and the Interborough Rapid Transit (IRT) trains out of service. The rest of the service was restarted later that day, with partial closings on the Lexington Avenue line.

Emergency operators at the MTA ordered all available equipment into Grand Central and Penn Stations. Three lines on Metro-North and three lines on the Long Island Rail Road were used for evacuation. Trains operated on a load-and-go basis, departing as soon as they were filled. This procedure had been used before, and interviewed sources said that commuters were familiar with it.

Buses loaded passengers and headed north. No one paid attention to fares or routes. NYPD's Harbor Unit ferried 5,000 people to New Jersey and Staten Island, and the commercial ferry transports and tugboats moved victims and fleeing people to New Jersey. Thousands walked uptown or across the bridges that had been closed to vehicle traffic. Many waited at the end of the bridges to cheer those who came after them.

At each of MTA's operating agencies, decisions were made to ensure that the systems were safe and to provide maximum service to evacuate people from the WTC area. As the areas of damage were identified, alternate methods of providing transportation were being evaluated. Bus service could be substituted on a limited basis for some train service in Lower Manhattan, and alternate lines still in service could take passengers to nearby stations.

Although the evacuation problem was not as acute in Washington, D.C., hundreds of thousands of commuters there did have to get home. The Metro subways continued service, rejecting advice to shut down for security reasons, while Metro buses loaded passengers and headed out of the city. Traffic jams prevented them from returning to pick up more passengers.

The metropolitan Washington area comprises two states and the District of Columbia, with dozens of police agencies with overlapping jurisdictions. Traffic circulation problems were exacerbated by failure to coordinate street evacuation planning. The Office of Personnel Management closed all government buildings and sent federal employees home without notifying the District of Columbia Police Department, which was not able to implement traffic control procedures, resulting in notable traffic snarls. For example, while Washington officials were advising people to evacuate by the 14th Street Bridge, Virginia authorities had closed the roadway over the state line. Furthermore, a study by the Volpe Center of the effects of catastrophic events on transportation systems suggested that the high-occupancy vehicle lanes could have been reserved for two-way bus traffic to facilitate evacuation.[7]

[7] U.S. Department of Transportation, John A. Volpe National Transportation Systems Center, *Effects of Catastrophic Events on Transportation System Management and Operations: A Cross Cutting Study,* January 2003.

# ACTIONS TAKEN AFTER THE INITIAL RESPONSE

## RESTORING TRANSPORTATION SERVICES

At midday on September 11, highways, bridges, and tunnels leading into Manhattan were shut down or reserved for emergency vehicles. No vehicle with fewer than three passengers could enter New York City below the 59th Street Bridge. High-occupancy vehicle lanes were reserved for emergency workers. Trains leaving Grand Central Station and Penn Station were filled with passengers getting out of the city. Inbound trains carried only emergency personnel. Buses continued to operate in the city, but Manhattan was essentially cut off from the outside. Restrictions on vehicular traffic continued for some time, so public surface transportation became the city's lifeline. Recovery from the catastrophe depended on rapid restoration of service.

NYC Transit suffered the most damage. Four subway corridors were affected, with 1,400 feet of tunnel in Lower Manhattan destroyed. Six miles of water mains were broken, and the 7th Avenue tunnel was flooded in the immediate area. The Cortland Street station was completely destroyed, as was the PATH station beneath the World Trade Center. There were problems with power and signals, and continuing fires and collapsing buildings added safety concerns. Alternate routes around the worst damage had to be quickly laid out and publicized.

Shutting down the entire system was a security decision, not a consequence of damage. Mindful that terrorists in 1993 had contemplated attacking tunnels, officials decided that trains could start running only after all tunnels in the area had been searched and secured. This was quickly done; then the system was tested with empty trains before regular trains were allowed to load passengers. At 12:48 P.M. on September 11, 2 hours and 28 minutes after the shutdown, service was resumed and soon reached 6 percent of its normal level. Service on the peripheral lines was restored first, then service to Manhattan was resumed. By 1:40 P.M., the system had reached 33 percent of its normal service level, and by the end of the day, it was running at 65 percent. Within two days, the service level was back up to 72 percent, and by September 17, the day the markets reopened, it had been restored to 84 percent.[8]

Further gains required plugging damaged tunnels, restoring power and signal systems, and resolving other problems in Lower Manhattan. Planning processes that normally took a year were compressed into days. With the resumption of service in Lower Manhattan, the system came back to 92 percent. A year after the attack, it was at 98 percent.[9]

[8]Lawrence G. Reuter, President, New York City Transit, "Terrorist Attack: Response and Prevention," American Public Transportation Association Annual Conference, Las Vegas, September 23, 2002.

[9] Reuter. Remarks during "Post 9-11: Rebuilding Transit Services in Lower Manhattan," American Public Transportation Association Annual Conference, Las Vegas, September 24, 2002

Other transportation operators also raced to restore service or develop alternatives. By September 16, New Jersey Transit had designed, taken out permits for, constructed, and begun operations on a new ferry service across the Hudson River.

The MTA's reconstruction efforts were hampered by the loss of some of the crisis-management plans in the World Trade Center collapse, and the continued closure of Lower Manhattan prevented access to plans and drawings needed for rebuilding the system. It became clear that plans and other documents essential to crisis management, business continuity, and rebuilding need to be online or dispersed.

In Washington, D.C., Amtrak met the new demand for train service created by the closure of Reagan National Airport and people's fear of flying. Many who commuted to New York stayed home for a few days, but passenger loads gradually came back. In the weeks following September 11, New Jersey transit saw a 3 percent increase in passengers to Manhattan, a 45 percent increase in passengers commuting between Newark and Penn Station, an increase of more than 60 percent in passengers on the Hudson-Bergen light rail line, and an even more dramatic increase in riders on the New Jersey Transit Midtown Express lines.

## SAVING THE TUNNELS

NYC Transit mangers' first priority was to preserve the undamaged portions of the system and to protect the rest from flooding. They were also concerned about the weight of the rubble and the heavy equipment now working above transit tunnels. Along with preserving the underground structures and keeping the rescuers working above them safe, the NYC Transit authorities were intent on protecting the infrastructure to restore service as soon as possible.

Because the normal outlets from flooded tunnels went to crushed sewers that just recirculated the water back to the flooded area, NYC Transit workers had to lay discharge lines above ground to working sewers. They pumped 4,000 gallons per minute from the flooded tunnels for three days before the New York City Department of Engineering and Planning was able to shut off the water. To contain the flooding, two concrete bulkheads were constructed at Park Place to the north and Cedar Street to the south within the 1/9 line subway tunnel. The Port Authority implemented dewatering along West Street and Liberty Street to reduce the lateral load on the slurry wall. They also negotiated an emergency contract to create a bulkhead against a large water inflow. The flood that had been calculated to occur if the World Trade Center site's retaining wall were to fail could have filled tunnels with several feet of water, so steel dowels were used to secure the plug.

The tunnel under the World Trade Center plaza was bearing extra weight from the cranes and other equipment used in the rescue effort. The heavy crane used by the New York City Department of Design and Construction to clear and remove debris was located directly over the subway roof of the 1/9 line at the PATH escalators. The tunnel was shored up with posting and

bracing to prevent a collapse as removals and demolition continued above. Instrumentation was added to monitor the effects of the removals and demolition on the NYC Transit property. The levels and inclinometers showed changes in the subway structures, and the vibration measurements calibrated the effect that transit operations might have on nearby structures.

The focus was on restoring service in the areas where it was most needed. The N/R train facilities were intact except for the Cortland Street station exits and some facilities rooms. The E Exit in the World Trade Center was ruined, and the 1/9 line needed lengthy engineering studies because of the loss of the 1,400 linear feet of tunnel and two fan plants. The tunnel was also flooded between Vesey and Barclay Streets because of a broken water main. Quick fixes led to the reopening of the N/R line, minus only the Cortland Street station, on October 21, 2001. The 1/9 line could not pass through the World Trade Center site, so stations at Cortland, Rector, and South Ferry remained closed.

## OLD PLANS APPLIED TO NEW EMERGENCIES

Transit, including bus, subway, and rail connections to the city, was represented at the EOC by the MTA, with which OEM had developed good relations prior to 9-11. The two organizations had worked together in the past, shutting down subway lines when buildings collapsed. New York's old infrastructure and aging building stock led to the loss of an average of 200 structures per year to decay and dry rot. Building collapses are so common in the city that a special part-time fire department unit has been established to respond specifically to them.

In addition, OEM had worked with transit agencies to support emergency evacuations and provide temporary shelters. Before the 9-11 attacks, OEM and the transit agencies had been developing a plan to use buses for hurricane evacuations. The plan was adapted to support the response to 9-11.

New York City's emergency planning had taken into account a variety of potential natural disasters, as well as terrorist attacks. There is, for example, an earthquake fault at 125$^{th}$ Street in Manhattan. In the summer of 2000, the city conducted a tabletop exercise for top city officials, simulating the release of a biological warfare agent at a sporting event. During the exercise, the Police Commissioner decided he would shut down Manhattan, so a method for doing so had to be considered. Other players were skeptical, but they talked it through. This had led to an informal understanding of how an operation as large as stopping traffic through the tunnels and on the bridges could be handled. Initially, all traffic would be one way out of the city, then the routes would be closed.

On September 11, this plan was implemented, along with restrictions on transit. Surface transportation was sealed off below Houston Street until January 2002, with access only for residents and emergency vehicles. Although necessary for security reasons, this limitation made it

difficult for businesses to restart, since employees had few ways to get to work. Furthermore, many small businesses that depended on foot traffic and tourists did not reopen. Merchants in Chinatown and small businesses that served the Financial District were especially hard hit.

One week prior to the 9-11 attack, MTA and NYC OEM had been preparing a tabletop exercise to develop plans for recovery of operations and business continuity in the Financial District after a terrorist attack. Discussions and plans for a program known as BNET (Businesses Networking) had been tested in Buffalo, New York. The plan provided for credentialing key staff for businesses to gain access to a restricted area. After 9-11, credentialing of people needing or wanting access to the site became very difficult to manage. Those plans are currently under review.

# THE CRITICAL ROLE OF PUBLIC TRANSPORTATION

As noted earlier, crisis management planning normally views public transportation systems as targets or venues for terrorist attack. There is a tendency to overlook their critical role in the evacuation of urban areas threatened by or following terrorist attacks. Another overlooked role is that of assisting in rescue efforts. In increasingly service-oriented economies, however, transit systems may be the only entities with the specialized equipment and skills required for large-scale rescues. It is notable that MTA has many assets than can help with rescue and recovery work, including truck cranes, hydraulic equipment, portable lights, emergency generators, dump trucks, and snow plows.

New York's transportation operators moved thousands of police officers[10] and emergency personnel into the city by train and then ferried them by bus to Ground Zero, while the NYC Transit EOC immediately began to assemble equipment and workers to assist in the rescue effort. Within two hours of the attack, only minutes after the collapse of the North Tower, the MTA had mobilized a two-mile-long convoy of specialized heavy construction equipment and 3,500 employees to assist in rescue and debris removal. NYC Transit ironworkers assisted the fire department by cutting steel to rescue victims, and workers from every NYC Transit division staffed bucket brigades to remove debris from the search and rescue areas. At one point, MTA employees comprised 60 percent of the rescue force, according to one official interviewed.

All electric power to the attack areas was lost. NYC Transit generators that are normally used in the agency's construction projects were delivered to provide power to traffic signals, illuminate stations for damage assessment, and illuminate the attack area for the fire department's rescue efforts. Other generators were loaned to Verizon to assist in maintaining telephone networks and keeping fiber-optics node sites in operation.

## MAKING MEDICAL CARE AVAILABLE

New York's OEM has a full-time medical director who coordinates with transit agencies and other members of the medical community seeking ways to mitigate the health consequences of disasters. The decision to seal off a portion of Lower Manhattan had severe medical consequences.

The New York City Health Department had to move and allocate patients to medical care facilities immediately after the 9-11 attack. Historically, NYC Transit has cooperated with the Health Department by providing buses to move patients, taking the moderately injured ("greens" or "walking wounded") to medical facilities further from the event site so that nearby resources

[10]Eight thousand NYPD officers live on Long Island.

could be reserved for the more seriously injured. The Health Department uses the Incident Management System, a variation on the standard Incident Command System (ICS), to coordinate its responses.

The New York City emergency medical system responds each year to about a thousand multiple-casualty incidents, such as traffic accidents and other everyday events with multiple casualties. These events provide opportunities for repeated training. Prior to 9-11, the Port Authority had been putting together its own OEM and holding incident command training sessions at New York's three commercial airports. Port Authority officials had found that meeting ahead of time with their partners—medical and others—led to success in actual responses. According to one senior official, "You cannot plan too much, but you have to remain flexible."

Effective emergency medical response depends on participating agencies working together as closely as possible. This principle was important when self-dispatched patients, the walking wounded, showed up at the hospitals nearest the World Trade Center. Others went to New Jersey on the ferry, following an instinct to flee the danger and then seek medical attention. Walking wounded patients from the World Trade Center were reported to be as far away as Long Island, Connecticut, upstate New York, and Montreal, Canada. Many people used public transportation to get to medical facilities.

Water assets augmented traditional transit for moving patients. More than 8,000 patients were decontaminated and treated by New Jersey Emergency Medical Services personnel and fire personnel at the Hoboken Ferry Terminal in New Jersey. Patients and evacuees arrived by small boats, yachts, tugboats, sightseeing boats, Coast Guard boats, and NYPD boats. Evacuees were also transported via water from Manhattan to Brooklyn and Staten Island. *Professional Mariner Magazine* compared the effort to the Dunkirk evacuation of British soldiers from French beaches in World War II.[11]

Loss of electrical power can also be a problem for homebound, medically dependent individuals. Consolidated Edison has a support program for these customers in the event of power failures: Rental agencies that supply medical equipment are supposed to provide power backup and notify Con Ed of the locations of their patients/customers. The most urgent concern is ventilator patients who may be unable to help themselves during a power outage or any other emergency.

Many elderly and medically fragile residents of Lower Manhattan depend on transit and paratransit services of MTA for access to medical care. Following 9-11, much of Lower Manhattan was isolated from all city services, including transit, stranding medically fragile people. The New York City Health Department created teams to visit the homebound elderly in the isolated area near the WTC to check on their medical status. Many of the low-income elderly

[11]Hank Christen, Director of Emergency Response Operations, Unconventional Concepts Inc, Commentary, 2003.

were without telephones, and many had language limitations. Most had relied on the mass transit routes that were now closed. The teams facilitated their continuing medical care for chronic conditions, including delivery of prescription refills.

## PROVIDING INTERNAL COMMUNICATIONS

Communications problems invariably plague all crises. The collapse of the World Trade Center towers knocked out Verizon's switching center in Lower Manhattan and severely damaged the infrastructure for cellular telephones. Telephone communications for NYPD Command and Control was also destroyed in the attack. As a consequence, cell-phone service was subsequently overloaded. NYC Transit lost a key portion of its fiber-optic network in one tunnel. The new repeaters installed inside the World Trade Center towers worked until the towers collapsed, but the Port Authority police radios did not work in the tunnels. Furthermore, the emergency communications systems were not all interoperable. Communications problems impeded overall coordination.

The fact that the MTA could still communicate demonstrates the necessity of redundant communications capabilities. NYC Transit had multiple communications systems for both bus and subway systems, its own radio network, a six-wire system, an emergency booth communications system, a train dispatch system, and computer networks, all of which continued to function. NYC Transit also had the only telephone structure independent of Verizon. Therefore, it had working phone links with both the fire and police departments, and its NEXTEL radios continued to work. NYC Transit and New Jersey Transit quickly deployed mobile communications centers. This capacity enabled NYC Transit to provide landline service to the NYPD command post and to emergency services in the field, while transit technicians assisted in the repair of the damaged communications systems.

## INFORMING THE PUBLIC

Because of the magnitude of the event, keeping the public informed was a huge task. Continuous live media coverage was essential to ensure that everybody knew what was going on. Extraordinary measures and behavior were required. There were very few instances in which individuals challenged authority or ignored instructions. Most people did the right thing spontaneously. They moved away from the immediate danger zones and kept out of the way of emergency personnel. There was remarkably little panic except in the first moments of the towers' collapse.

The identifiable nature of the threat helped. Fearing that another hijacked airplane might crash in Washington, D.C., people got out of buildings and waited in the adjacent parks. Had the attack involved chemical or biological substances—unseen dangers—the reaction would likely have been different. Although the news media kept the public well informed, there were occasional

false reports of targets that had been struck, of new threats, of shutdowns and closures. Inevitably, there were rumors.

High-ranking officials at the city, state, and federal levels held frequent press conferences, calming the public by their physical presence; at the local level, they offered specific instructions. Transportation officials initially had to communicate evacuation instructions; then they had to provide new information regarding closures and route changes. This was particularly important in New York City, which depends heavily on public transportation.

Transportation operators employed many modes of communication. Instructions were posted on websites; communicated via television, radio, and newspapers; posted on electronic highway signs; and repeated on public address systems in stations and bus terminals. New York's MTA and NYC Transit and New Jersey Transit also sent administrative staff into the streets and subways armed with bullhorns and newly printed maps and instruction sheets, to provide up-to-date information, hand out flyers, and directly assist passengers.

Demand and response reached staggering volumes. The MTA's website went from 250,000 hits on an average day to 7.2 million hits on September 11, 7.4 million on September 12, and 10 million the next day. In a single 24-hour period, the MTA printed and distributed 1.5 million single-page route maps and instructions.[12]

The lessons learned about crisis communications and emergency public information are clear:

- Public communications are a vital component of crisis response and consequence-management plans.
- Coordination among and within agencies is critical.
- A multimedia approach to communications is required, and operators must be prepared for huge volumes of traffic on websites and able to provide vast quantities of printed material.
- Administrative staff can be effectively employed as front-line communicators. This worked well in a city where many people use public transportation, but cities in which private automobile use is more common would face different problems. Circumstances in which persons unaccustomed to using public transportation were suddenly forced to do so would require additional efforts.

[12]MTA - New York City Transit, "The Day That Shook Our World," special issue of *At Your Service*, October/ November 2001.

# IMPLEMENTING INCREASED SECURITY

In a major terrorist event, local police departments may be stretched thin, unable to provide additional security or respond to every new threat. The National Guard may be available but probably will lack detailed knowledge of transportation systems. Thus, transportation operators may have to depend on their own resources. The Port Authority of New York and New Jersey and the MTA have their own police departments, which they deployed on September 11. MTA police requested support from local jurisdictions along their routes to fill in for redeployed MTA police. In addition, the NYPD had 2,700 trained transit police, who won praise in the McKinsey review of police performance.[13]

Operating in a high-threat environment and plagued by false alarms and bomb threat hoaxes, transportation operators increased police presence at stations and bus terminals; patrolled and secured tunnels and bridges; regularly swept trains and ferries for suspicious objects; and secured headquarters, bus and train yards, and maintenance facilities. Transportation employees were required to display badges at all times; visitors were escorted. Subway tunnel facilities and utility rooms were locked when not in use. New protocols were established for dealing with bomb threats. An "eyes and ears" program enlisted 47,000 employees in surveillance, and a 24-hour human-operated hotline was set up to receive security tips.

MTA is expanding its canine unit to provide bomb detection dogs throughout the system. The MTA Police Department is expanding the Emergency Service Unit to provide rescue and control during a hazardous materials event or attack. The Highway Unit is strengthening security for bridges and tunnels.

Longer-term security improvements included the provision of new ID vests for MTA employees and improved hologram identification badges. Additional closed-circuit television (CCTV) cameras were installed throughout the system, and high-security zones were designated for intense surveillance. To prevent truck bomb attacks, truck access was limited near stations, and trucks and vans were searched before they entered tunnels. Security booths were installed at many locations, emergency exits from subway tunnels were hardened, and intrusion alarms were installed on the doors. Detection systems for chemical or biological attacks are still in the research stage, although the Washington Metro has installed an experimental system.

Security reviews, simulations, and drills continue to be conducted. These are aimed at anticipating the consequences of and response to some of the schemes terrorists reportedly may be contemplating, including chemical attacks and radioactive-material dispersal devices.

[13]McKinsey & Company, op. cit.

After 9-11, New Jersey Transit increased the size of its police force, added bomb-sniffing dogs, and turned over responsibility for routine patrolling to local police departments, thereby enabling the transit police to focus their efforts on five key stations and terminals. Training has been increased for both police and maintenance personnel.

The Port Authority has embarked on a massive program to upgrade security at its ports, airports, rail systems, and other critical infrastructure.

Although the newly created federal Transportation Security Administration has proposed passenger screening and has implemented new rules for ferry boats, the aviation security model does not seem applicable to public surface transportation.

# INTELLIGENCE LIMITATIONS

Nearly two years after the 9-11 attacks, the terrorist threat remains high. According to the new national threat alert system, the condition usually is "yellow," indicating an elevated threat, although on several occasions, the condition has been raised to "orange," indicating a high level of threat. New York and Washington, D.C., have remained at the orange alert level for most of the period.

The color-coded system is merely a way of consolidating all available intelligence and communicating a judgment—and the key word is "judgment"—to the 50 state governments and the nearly 18,000 police jurisdictions in the country, as well as to those in the private sector who have security responsibilities.

The warnings communicated publicly tend to be general, often based on a combination of bits of information, the mere volume of terrorist communications, and surmise. If authorities had specific information, they could move on it to thwart an attack. However, the nonspecific information currently provided makes it difficult to act on the coded warnings locally. For example, the State of Arizona has formally announced that its state and local response agencies will not initiate force protection measures based on national threat warning system levels.

Recipients of the available threat information, including transportation operators, complain that the information takes too long to get to them and is too general to enable specific actions other than to increase security in general, which can be costly. Transportation operators in New York complain that they often get information through the MTA Police Department days before they receive the same information from the NYPD. MTA Police are on the FBI Joint Terrorism Task Force and the NYPD Counter Terrorism Bureau to enhance their information gathering about terrorism threats nationally and internationally. Although the current system is imperfect, the NYPD has attempted to improve the situation by devoting 1,000 of its officers to counterterrorism and by creating a new position, Deputy Commissioner of Police for Intelligence, to be in charge of intelligence for dealing with the terrorist threat. That position is currently filled by a former senior CIA official.

The receipt of a general warning or an elevation of the threat level usually sets off a flurry of speculation and efforts by local jurisdictions and operators to find out more. Their expectations may be too high. The generic information communicated is often all the federal government has. The disparities in communications suggest that local public transportation operators, especially those that do not have their own police departments, should take steps to ensure that they are part of the local law enforcement communications network.

National threat alerts remain just that—they do not dictate the security measures to be taken. Whether and how to respond must be decided by local operators in consultation with local police officials. It makes sense, however, to have preplanned menus of security measures that can be implemented at various threat levels.

# REBUILDING LOWER MANHATTAN

In the first few months after September 11, there were periodic bomb scares in the subways, and anthrax threats closed subway lines and stations periodically. The smoke lasted for months. According to one observer, "The area [near Ground Zero] looked like Pompeii, with ash in the street."

The area reopened in stages. City building officials confirmed the structural soundness of buildings, then owners had to contract with private firms to remove the dust and ash from their building facades. Many buildings had severe window damage; in some, as many as 75 percent of the panes facing the direction of the collapse had to be replaced. Some buildings, including the graduate school dormitories of New York University, had to be secured for weeks as part of the crime scene, while debris and body parts were carefully removed. Only when the investigative work was completed could the cleanup and repair begin.

The area east of Broadway was reopened first, with street cleaning followed by building cleaning. Dust removal and disposal was a problem for building owners, as well as for the business and residential tenants. Because the dust contained toxic substances and carcinogens, including asbestos and fiberglass, a thorough professional cleanup was required. Eventually the area of exclusion was moved south from Houston Street to Canal Street, then to Canal Street east of Broad; finally, Chambers Street was reopened.

NYC Transit studied the alternatives to rebuilding the 1/9 line exactly as it had been. They recognized a need to comply with the Americans with Disabilities Act (ADA) and a desire to create new connections among transit assets in Lower Manhattan. The existing capital program remained the priority, and by carefully selecting the repair and restoration strategies, NYC Transit was able to keep its capital program on schedule. New projects, including security projects, were added in Lower Manhattan. The damaged stations were refurbished rapidly, enabling the N/R trains to resume operation before the end of 2001.

Recognizing the importance of these transit links to New York's economy, the governor issued an order to resume 1/9 line IRT service to the South Ferry Terminal station by November 2002. One mile of the 1/9 line was rebuilt in a box tunnel across the World Trade Center property. The project included demolishing the tunnel between Barclay and Liberty Streets and the Cortland Street station on the 1/9 line, and restoring or repairing the signal system, DC power, communications, tracks, lighting for stations and tunnels, and pumps and ventilation equipment. The track replacement runs from the South Ferry station to Chambers Street station.

As part of the overall project, additional improvements are being undertaken. Two new fan plants will be installed to improve fire protection and ventilation. A connection between the 1/9 line and

the N/R line Rector Street stations will be built to provide for ADA access to both stations. A new head house will be constructed at street level. This phase of the project should be completed by December 2005.

# ORGANIZATIONAL CHANGES IN OPERATING AGENCIES

The MTA's crisis- and consequence-management review indicated that the MTA could adopt a more formal coordinating role. This would not move crisis management planning or response from the operating agencies, but would ensure overall preparedness and the compatibility of crisis plans (critical in major disasters involving multiple operating agencies); assist in coordination and redeployment of assets across the transportation system; and help in areas that transcend individual agencies, from risk management to assisting victims' families.

The attacks on September 11 clearly required a coordinated effort among every agency of the MTA plus the Port Authority, New Jersey Transit, Amtrak, and other public transportation entities. Before 9-11, the newly created MTA Police Department assumed the lead role in coordinating security activities within the MTA. After 9-11, the MTA decided to create a Director of Security at MTA Headquarters, a decision that created an awkward situation with the chief of the MTA Police Department, since the MTA police certainly had not been judged as having performed inadequately on September 11.

The risk-management function for the operating agencies was also consolidated at MTA. As will be seen in the next section, it remains the responsibility of the New York City OEM to ensure coordination among the various transportation operators.

# PREPAREDNESS REVIEWS

OEM has an all-hazards emergency response plan that anticipates the use of MTA assets in disasters. The plan includes strategies for specific disaster events, such as hurricanes. Buses are to be used for evacuation of threatened areas, movement of victims, transport of first responders and emergency equipment to disaster scenes, and as temporary shelters for victims. Commuter trains, buses, subways, PATH, and the Long Island Rail Road provide a rich mixture of resources for disaster response.

OEM staff members are working with transit agencies to continue to strengthen their relationships. As a consequence of 9-11, plans are now in place to add cars to trains or to alter bus service in response to disaster needs. OEM has developed stronger links to all transit agencies. Each MTA agency had its own evacuation plan in place before 9-11, but these plans were not all coordinated with each other or with the OEM. MTA has since assigned two of its employees to act as liaison officers to ensure coordination of emergency plans with the OEM. In future events, these officers will become the lead staff to coordinate the emergency response between OEM and MTA, which represents the transit community.

Although the NYPD does not use the standard ICS espoused by FEMA, it has had the benefit of better on-scene, cross-agency communication since 9-11. Port Authority police officers are certified as both law enforcement officers and firefighters; as such, they are well acquainted with ICS. Under the new Homeland Security requirements, all public safety agencies and field response agencies will be required to use the National Incident Management System (NIMS).[14]

Some emergency responses, such as the use of ferries, were created as a consequence of 9-11, without preplanning. Placement of MTA representation within the day-to-day planning structure of OEM will help to institutionalize the best of the improvised plans.

The MTA now holds more frequent unannounced drills, sponsored by MTA management or OEM. The MTA is in the process of digging a new tunnel from Queens that is 140 feet below grade with no easy access. The MTA and OEM are conducting a tabletop exercise to review the response to a potential construction accident and to consider how they could adapt their plans to this unique circumstance.

Another concern for the MTA is the lack of a centralized and consistent emergency response plan for dealing with incidents at major stations. This is a significant challenge because NYC Transit

[14]Beginning in Fiscal Year 2005, federal departments and agencies shall make adoption of the NIMS a requirement, to the extent permitted by law, for providing federal preparedness assistance through grants, contracts, or other activities. The Secretary of Homeland Security shall develop standards and guidelines for determining whether a state or local entity has adopted the NIMS. See Appendix A, "Homeland Security Presidential Directive 5."

shares some stations with PATH, the railroads, and other transit providers, creating a problem of multiple jurisdictions within a station. The solution would seem to be more crisis response and consequence management planning, with greater interagency emphasis.

# PRESERVING VALUABLE EXPERIENCE

After 9-11, the NYPD facilitated the creation of committees to review training, incident response, communications, intelligence and investigations, and public safety, including its experience in coordinating with other field responders such as transit. It also commissioned McKinsey & Company to propose ways in which the department might improve its emergency preparedness and response. The McKinsey report[15] identified 20 areas where improvements could be made, six of them worthy of immediate attention:

1. A clearer delineation of roles and responsibilities of NYPD leaders
2. Better clarity in the chain of command
3. Radio communications protocols and procedures that optimize information flow
4. More effective mobilization of members of the department
5. More efficient provisioning and distribution of emergency and donated equipment
6. A comprehensive disaster-response plan, with a significant counterterrorist component.

The report criticized the NYPD for not having a formal system for post-incident analysis. (This is a common shortcoming.)

Compliance with Homeland Security Presidential Directive 5 (see footnote 14, page 43) would effectively address these identified areas of concern.

NYC Transit has made a conscious effort to review its experience and preserve the lessons learned. MTA's Bridges and Tunnels division prepared a separate after-action report. The MTA, which completed a review of its crisis management shortly before 9-11, is initiating a new assessment of the risks it faces and its preparedness.

New Jersey Transit hired the Bratton Group, headed by former New York Police Commissioner William Bratton, to critique its performance on 9-11. Commissioner Bratton's report was critical of the 132-person New Jersey Transit police force, which he found ill-prepared to protect commuters from terrorist attack. The report recommended the creation of a special force to respond to terrorist activity, increased training, and more simulations and exercises.

The Volpe Center's excellent study of the effects of catastrophic events on transportation systems[16] included case studies of events related to 9-11 in both New York and Washington, D.C.

[15] Ibid.

[16] U.S. Department of Transportation, op cit.

The study emphasized the importance of advance preparation and planning ("Knowledge gained and relationships developed through day-to-day contact are extremely useful when catastrophes strike."); institutional coordination, both internal and external; communications capabilities; advanced technologies for monitoring situations and communicating to the public; and system redundancy and resiliency.

Some officials in the transportation entities and police departments have complained of a tendency to "re-engineer rather than preserve and learn." Much information has been swept away. Undoubtedly, much has been lost as restructuring, rotation, and retirements already have dispersed precious 9-11 experience. Transit officials believe that all existing hazards plans should be reviewed and strengthened. Federal funding should be focused on hardening targets and enhancing overall security.

# LESSONS LEARNED

Following every major emergency and disaster, public agencies conduct reviews of their performance and create after-action reports to collect information on the successes and failures of plans and operations. These reports become the basis for improving the emergency planning and preparedness actions of the organizations.

The events of September 11, 2001, and its aftermath provide a wealth of lessons learned. Some are new, while others underscore lessons learned from previous incidents. Most of these lessons fall into three categories. First, they reiterate the importance of a uniform command and control structure throughout the event. The newly mandated National Incident Management System (NIMS) will provide such a cross-departmental and interagency system, as discussed below. Second, these lessons demonstrate the importance of all-hazards emergency planning. Although the cause of the crisis may require some specific actions, the management of the consequences follows a similar path, regardless of the initial cause. Third, the lessons reinforce the importance of pre-event planning, training, and exercises (PTE). It was the existing all-hazards plans, and the history of training personnel and exercising the plans, that empowered individuals to manage elements of the 9-11 disaster with confidence and success.

## LESSONS LEARNED REGARDING COMMAND AND CONTROL

- The emergency public information function is an essential element of NIMS. Keeping the public informed requires a multimedia, high-volume effort. Deploying administrative staff to be front-line public information officers was especially effective during the 9-11 crisis and would be essential in cities where the population is not accustomed to using public transportation. The public also can be enlisted to assist with surveillance if emergency public information officers establish a system to receive citizens' information.
- Increasingly, terrorist incidents involve multiple attacks. Major terrorist attacks will inevitably spawn false alarms and numerous hoax threats. Following a major attack, transportation will continue to operate in a high-threat environment for months. Within the new system, emergency public information officers coordinate with law enforcement to prevent rumors and garner public assistance with surveillance.
- Even with current improvements in the intelligence-sharing function, transportation operators cannot depend on timely warning of attacks. Intelligence will often be vague, and attacks will occur without warning. This is the nature of the threat. Operators can improve their situation somewhat by maintaining close liaison with police and federal authorities through NIMS planning/intelligence activities.
- The mutual aid system developing within many states and across state lines enables communities to access extra personnel and materiel resources in both pre-event and response

phases. In a major terrorist event, police will be stretched thin. Public transportation operators can use NIMS logistics to coordinate with entities that have their own police forces or trained transit police experts to augment their own resources. Organizations should also have contingency plans and resources for responding to problems on their own.

- Security considerations as well as traffic control may necessitate restrictions on private automobile use for months after a terrorist attack. Increased use of public transportation should be anticipated. This is addressed in NIMS.
- Recovery planning may have to be compressed into days, sometimes hours. This, in turn, requires the flattening of hierarchies. This is a lesson of both the 1993 World Trade Center bombing and the 9-11 attacks. The implementation of the National Incident Management System (NIMS) across the nation will provide a flexible framework for response and recovery to all hazards.
- The destruction of the World Trade Center wiped out or prevented access to crisis plans, documents, and drawings necessary for response and reconstruction. To ensure continuity of business and rapid recovery, copies of vital documents should be cached at several locations and should also be available online at secure, password-protected websites. NIMS addresses this issue.
- Victim family notification is a key function that needs enhancement. After 9-11, NYPD had investigators working with OEM at Pier 92 to identify all victims or missing persons related to the WTC event. The NIMS structure provides for a coroner function and a law enforcement function. Transit agencies should develop their own NIMS-based plan to respond to a transit-based event, such as the Long Island Rail Road shooting, where hundreds of people may be affected. The plan, which can be integrated easily with regional NIMS-based activities, should include strategies for notifying families and working with investigators to identify the dead and trace the missing.

## LESSONS LEARNED REGARDING PLANNING

- Public transportation played a key role in evacuating Lower Manhattan and Washington, D.C. Chemical, biological, or radiological attacks and natural disasters such as hurricanes and earthquakes also may require large-scale evacuations. Transportation response plans should be prepared to handle these requirements under difficult circumstances. The evacuation effort in New York was successful because the transit operators had thought about it and planned for it.
- The MTA's role in transporting emergency personnel to Lower Manhattan was unanticipated, but could become a necessity in other situations and should be planned for.
- Because transportation operators may have specialized heavy equipment for construction, maintenance, and emergency response, as well as specialized skills that are increasingly rare in urban service-based economies, the MTA played a critical role in the rescue effort at Ground Zero and in helping restore parts of the city's infrastructure, including

communications. City officials and transportation operators should look at these assets as essential resources in dealing with all hazards and ensure coordination across department lines within city government, such as the Public Works Department.

- Redundant multimodal communications are essential. The 9-11 attack wiped out telephone lines and destroyed fiber-optic lines and antennas; the cellular system was overloaded. The MTA's redundant systems enabled it to communicate and to assist other city entities in communicating. Future planning should include the development of communications failure protocols as part of the overall emergency operations plan for all hazards.

## LESSONS LEARNED REGARDING PLANNING, TRAINING, AND EXERCISES (PTE)

- The single most important lesson of 9-11 is the importance of crisis planning and frequent response exercises, both tabletop simulations and field exercises. The City of New York and its public transportation system responded remarkably well on 9-11 despite the loss of emergency operations centers, the inaccessibility of vital documents, and communications difficulties, because they had devoted continuing attention to crisis management planning and exercises. The NIMS format will strengthen both individual agency response and interagency coordination. This has been proven for the last 20 years with the use of ICS in the fire service.
- Crisis plans, once completed, cannot be put on the shelf to gather dust, but must be periodically reviewed and updated. The mere conduct of a review will contribute to preparedness. Exercises should be conducted frequently.
- Response plans are fungible and can be adapted to different circumstances. Plans for natural disasters and contingencies addressed in tabletop exercises were applied to new circumstances on 9-11. Similarly, plans and exercises focused on response to terrorist attacks will apply to other kinds of disasters.
- The 9-11 terrorist attacks were unprecedented but cannot be considered a one-time anomaly. Today's terrorists are determined to carry out large-scale attacks and to kill in quantity. No security measure that public surface transportation operators could have taken would have prevented 9-11. Nevertheless, the attacks have forced operators to expand their notion of security to include how they would respond to future catastrophic attacks. The magnitude of the 9-11 attacks provides no justification for ignoring security against lesser terrorist attacks. Bombs, suicide bombers, and unconventional attacks remain real threats.
- Emergency operations centers may be destroyed or rendered inaccessible in a major catastrophe. Planning and drills should anticipate dispersal to other sites—something rarely done in exercises, owing to time constraints. Alternative sites should be identified and prepared in advance.
- Command centers or communications may be lost or impaired, but knowledge acquired and networks built on personal relationships created in exercises will survive.

- Prompt actions by front-line employees can save lives. Transportation employees are also first responders, so they require training and empowerment.
- Planning for responding to major terrorist attacks must be conducted on a regional basis. All large metropolitan areas contain multiple police jurisdictions, transportation authorities, and operators. Coordination is necessary.
- The public surface transportation system in New York was shut down not as a consequence of destruction, but as a result of a security decision; the Washington Metro refused to shut down. Crisis planning must include guidelines for deciding when to mandate shutdowns and how to do them once the decision is made. This is a controversial subject because mandated shutdowns, while understandable from the perspective of security, run directly counter to public transportation's mandate and mindset to keep the system moving. In an evacuation, a mandated shutdown could result in severe local overcrowding, creating additional threat opportunities and even halted trains. These, in turn, could impede self-evacuating civilians, contribute to panic, and disrupt the movement of emergency personnel and equipment—precisely the developments that authorities want to avoid.
- Security can be upgraded quickly by increasing the presence of police and security guards at stations and terminals and on trains and buses. Following a major terrorist attack, however, there may not be enough police personnel available to perform such functions, and there may be competition for additional contract security guards. Transportation staff can play a significant role if properly trained.
- Even though after-action reports are created, valuable experience can be lost. In less than two years, much of the field-level experience gained on 9-11 has been lost. The response to major events should be promptly captured and distilled into "lessons learned." Case studies can provide additional details of participants' experience.
- A regular program of comprehensive exercises is essential. Exercises must be repeated regularly to create a cadre of experienced people and to ensure that those in charge have the benefit of participation in challenging simulations.

## CONCLUSION

Cities are naturally resilient and hard to shut down, even in the face of massive destruction—a lesson of World War II. Life goes on and commerce continues, even under extraordinary circumstances. Transportation is a vital asset in recovery and the restoration of community life and commerce.

# CHRONOLOGY:
# THE DAY NEW YORK STOOD STILL

**8:46 a.m. - Plane hits North Tower**

**9:03 a.m. - Plane hits South Tower**

**9:17 a.m. - FAA shuts down NYC airports**

**9:17 a.m. - Amtrak suspends all service**

**9:17 a.m. - NY DOT shuts down highways**

**9:21 a.m. - Port Authority closes bridges and tunnels**

**9:40 a.m. - FAA grounds all flights**

**9:43 a.m. - Plane hits Pentagon**

**9:59 a.m. - South Tower collapses**

**10:00 a.m. - Armed forces put on high alert**

**10:20 a.m. - NYC Transit shut down**

**10:29 a.m. - North Tower collapses**

**10:30 a.m. - NJ Transit stops rail service to Penn Station**

**10:37 a.m. - Fourth plane crashes in Pennsylvania**

**10:45 a.m. - All PATH operations stop**

**10:50 a.m. - All remaining bridges and tunnels close**

# APPENDIX A:
# HOMELAND SECURITY PRESIDENTIAL DIRECTIVE 5

The issuance of Homeland Security Presidential Directive 5 (HSPD-5) on February 28, 2003 marked a change in federal/state/local relationships. The previous federal philosophy was to train and empower local agencies to respond to all hazards. Under HSPD-5 the federal government will now set the standards for and certify local first responders, withholding funds from noncompliant agencies. This directive creates the National Incident Management System (NIMS); the full text of the directive begins on the following page.

A Presidential Directive is a type of Executive Order and has the force of law in the management of Executive Branch activities. For example, Presidential Decision Directive 39 created the terrorism response protocols and designated federal lead agencies for crisis and consequence management. Because the Department of Homeland Security and the Federal Emergency Management Agency are part of the Executive Branch, these directives will determine relationships within the federal system.

NIMS has been mandated for all local and state governments by October 1, 2004, the beginning of federal Fiscal Year 2005. Loosely based on the widely used Incident Command System, and the Standardized Emergency Management System in place in California since 1994, NIMS will require that all emergency management and response agencies adopt the new structure of awareness, prevention (similar to mitigation), preparedness, response and recovery. The goal is to provide for a more effective interface among the levels of government to a terrorist attack, but it will also become the system for responding to the more frequent natural hazards in communities.

The authors have tried to draw attention to elements of the lessons learned from the tragedies of 9-11 that will help responder agencies at all levels develop NIMS-compliant planning, training, and exercises, leading to enhanced capability to prevent tragedies in the future and to respond effectively to those natural and human-caused disasters that do occur.

For Immediate Release

Office of the Press Secretary

February 28, 2003

Homeland Security Presidential Directive/HSPD-5

Subject: Management of Domestic Incidents

Purpose

(1) To enhance the ability of the United States to manage domestic incidents by establishing a single, comprehensive national incident management system.

Definitions

(2) In this directive:

(a) the term "Secretary" means the Secretary of Homeland Security.

(b) the term "Federal departments and agencies" means those executive departments enumerated in 5 U.S.C. 101, together with the Department of Homeland Security; independent establishments as defined by 5 U.S.C. 104(1); government corporations as defined by 5 U.S.C. 103(1); and the United States Postal Service.

(c) the terms "State," "local," and the "United States" when it is used in a geographical sense, have the same meanings as used in the Homeland Security Act of 2002, Public Law 107-296.

Policy

(3) To prevent, prepare for, respond to, and recover from terrorist attacks, major disasters, and other emergencies, the United States Government shall establish a single, comprehensive approach to domestic incident management. The objective of the United States Government is to ensure that all levels of government across the Nation have the capability to work efficiently and effectively together, using a national approach to domestic incident management. In these efforts, with regard to domestic incidents, the United States Government treats crisis management and consequence management as a single, integrated function, rather than as two separate functions.

(4) The Secretary of Homeland Security is the principal Federal official for domestic incident management. Pursuant to the Homeland Security Act of 2002, the Secretary is responsible for coordinating Federal operations within the United States to prepare for,

respond to, and recover from terrorist attacks, major disasters, and other emergencies. The Secretary shall coordinate the Federal Government's resources utilized in response to or recovery from terrorist attacks, major disasters, or other emergencies if and when any one of the following four conditions applies: (1) a Federal department or agency acting under its own authority has requested the assistance of the Secretary; (2) the resources of State and local authorities are overwhelmed and Federal assistance has been requested by the appropriate State and local authorities; (3) more than one Federal department or agency has become substantially involved in responding to the incident; or (4) the Secretary has been directed to assume responsibility for managing the domestic incident by the President.

(5) Nothing in this directive alters, or impedes the ability to carry out, the authorities of Federal departments and agencies to perform their responsibilities under law. All Federal departments and agencies shall cooperate with the Secretary in the Secretary's domestic incident management role.

(6) The Federal Government recognizes the roles and responsibilities of State and local authorities in domestic incident management. Initial responsibility for managing domestic incidents generally falls on State and local authorities. The Federal Government will assist State and local authorities when their resources are overwhelmed, or when Federal interests are involved. The Secretary will coordinate with State and local governments to ensure adequate planning, equipment, training, and exercise activities. The Secretary will also provide assistance to State and local governments to develop all-hazards plans and capabilities, including those of greatest importance to the security of the United States, and will ensure that State, local, and Federal plans are compatible.

(7) The Federal Government recognizes the role that the private and nongovernmental sectors play in preventing, preparing for, responding to, and recovering from terrorist attacks, major disasters, and other emergencies. The Secretary will coordinate with the private and nongovernmental sectors to ensure adequate planning, equipment, training, and exercise activities and to promote partnerships to address incident management capabilities.

(8) The Attorney General has lead responsibility for criminal investigations of terrorist acts or terrorist threats by individuals or groups inside the United States, or directed at United States citizens or institutions abroad, where such acts are within the Federal criminal jurisdiction of the United States, as well as for related intelligence collection activities within the United States, subject to the National Security Act of 1947 and other applicable law, Executive Order 12333, and Attorney General-approved procedures pursuant to that Executive Order. Generally acting through the Federal Bureau of Investigation, the Attorney General, in cooperation with other Federal departments and

agencies engaged in activities to protect our national security, shall also coordinate the activities of the other members of the law enforcement community to detect, prevent, preempt, and disrupt terrorist attacks against the United States. Following a terrorist threat or an actual incident that falls within the criminal jurisdiction of the United States, the full capabilities of the United States shall be dedicated, consistent with United States law and with activities of other Federal departments and agencies to protect our national security, to assisting the Attorney General to identify the perpetrators and bring them to justice. The Attorney General and the Secretary shall establish appropriate relationships and mechanisms for cooperation and coordination between their two departments.

(9) Nothing in this directive impairs or otherwise affects the authority of the Secretary of Defense over the Department of Defense, including the chain of command for military forces from the President as Commander in Chief, to the Secretary of Defense, to the commander of military forces, or military command and control procedures. The Secretary of Defense shall provide military support to civil authorities for domestic incidents as directed by the President or when consistent with military readiness and appropriate under the circumstances and the law. The Secretary of Defense shall retain command of military forces providing civil support. The Secretary of Defense and the Secretary shall establish appropriate relationships and mechanisms for cooperation and coordination between their two departments.

(10) The Secretary of State has the responsibility, consistent with other United States Government activities to protect our national security, to coordinate international activities related to the prevention, preparation, response, and recovery from a domestic incident, and for the protection of United States citizens and United States interests overseas. The Secretary of State and the Secretary shall establish appropriate relationships and mechanisms for cooperation and coordination between their two departments.

(11) The Assistant to the President for Homeland Security and the Assistant to the President for National Security Affairs shall be responsible for interagency policy coordination on domestic and international incident management, respectively, as directed by the President. The Assistant to the President for Homeland Security and the Assistant to the President for National Security Affairs shall work together to ensure that the United States domestic and international incident management efforts are seamlessly united.

(12) The Secretary shall ensure that, as appropriate, information related to domestic incidents is gathered and provided to the public, the private sector, State and local authorities, Federal departments and agencies, and, generally through the Assistant to the President for Homeland Security, to the President. The Secretary shall provide standardized, quantitative reports to the Assistant to the President for Homeland Security

on the readiness and preparedness of the Nation -- at all levels of government -- to prevent, prepare for, respond to, and recover from domestic incidents.

(13) Nothing in this directive shall be construed to grant to any Assistant to the President any authority to issue orders to Federal departments and agencies, their officers, or their employees.

Tasking

(14) The heads of all Federal departments and agencies are directed to provide their full and prompt cooperation, resources, and support, as appropriate and consistent with their own responsibilities for protecting our national security, to the Secretary, the Attorney General, the Secretary of Defense, and the Secretary of State in the exercise of the individual leadership responsibilities and missions assigned in paragraphs (4), (8), (9), and (10), respectively, above.

(15) The Secretary shall develop, submit for review to the Homeland Security Council, and administer a National Incident Management System (NIMS). This system will provide a consistent nationwide approach for Federal, State, and local governments to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. To provide for interoperability and compatibility among Federal, State, and local capabilities, the NIMS will include a core set of concepts, principles, terminology, and technologies covering the incident command system; multi-agency coordination systems; unified command; training; identification and management of resources (including systems for classifying types of resources); qualifications and certification; and the collection, tracking, and reporting of incident information and incident resources.

(16) The Secretary shall develop, submit for review to the Homeland Security Council, and administer a National Response Plan (NRP). The Secretary shall consult with appropriate Assistants to the President (including the Assistant to the President for Economic Policy) and the Director of the Office of Science and Technology Policy, and other such Federal officials as may be appropriate, in developing and implementing the NRP. This plan shall integrate Federal Government domestic prevention, preparedness, response, and recovery plans into one all-discipline, all-hazards plan. The NRP shall be unclassified. If certain operational aspects require classification, they shall be included in classified annexes to the NRP.

(a) The NRP, using the NIMS, shall, with regard to response to domestic incidents, provide the structure and mechanisms for national level policy and operational direction for Federal support to State and local incident managers and for exercising direct Federal authorities and responsibilities, as appropriate.

(b) The NRP will include protocols for operating under different threats or threat levels; incorporation of existing Federal emergency and incident management plans (with appropriate modifications and revisions) as either integrated components of the NRP or as supporting operational plans; and additional opera-tional plans or annexes, as appropriate, including public affairs and intergovernmental communications.

(c) The NRP will include a consistent approach to reporting incidents, providing assessments, and making recommendations to the President, the Secretary, and the Homeland Security Council.

(d) The NRP will include rigorous requirements for continuous improvements from testing, exercising, experience with incidents, and new information and technologies.

(17) The Secretary shall:

(a) By April 1, 2003, (1) develop and publish an initial version of the NRP, in consultation with other Federal departments and agencies; and (2) provide the Assistant to the President for Homeland Security with a plan for full development and implementation of the NRP.

(b) By June 1, 2003, (1) in consultation with Federal departments and agencies and with State and local governments, develop a national system of standards, guidelines, and protocols to implement the NIMS; and (2) establish a mechanism for ensuring ongoing management and maintenance of the NIMS, including regular consultation with other Federal departments and agencies and with State and local governments.

(c) By September 1, 2003, in consultation with Federal departments and agencies and the Assistant to the President for Homeland Security, review existing authorities and regulations and prepare recommendations for the President on revisions necessary to implement fully the NRP.

(18) The heads of Federal departments and agencies shall adopt the NIMS within their departments and agencies and shall provide support and assistance to the Secretary in the development and maintenance of the NIMS. All Federal departments and agencies will use the NIMS in their domestic incident management and emergency prevention, preparedness, response, recovery, and mitigation activities, as well as those actions taken in support of State or local entities. The heads of Federal departments and agencies shall participate in the NRP, shall assist and support the Secretary in the development and maintenance of the NRP, and shall participate in and use domestic incident reporting systems and protocols established by the Secretary.

(19) The head of each Federal department and agency shall:

(a) By June 1, 2003, make initial revisions to existing plans in accordance with the initial version of the NRP.

(b) By August 1, 2003, submit a plan to adopt and implement the NIMS to the Secretary and the Assistant to the President for Homeland Security. The Assistant to the President for Homeland Security shall advise the President on whether such plans effectively implement the NIMS.

(20) Beginning in Fiscal Year 2005, Federal departments and agencies shall make adoption of the NIMS a requirement, to the extent permitted by law, for providing Federal preparedness assistance through grants, contracts, or other activities. The Secretary shall develop standards and guidelines for determining whether a State or local entity has adopted the NIMS.

Technical and Conforming Amendments to National Security Presidential Directive-1 (NSPD-1)

(21) NSPD-1 ("Organization of the National Security Council System") is amended by replacing the fifth sentence of the third paragraph on the first page with the following: "The Attorney General, the Secretary of Homeland Security, and the Director of the Office of Management and Budget shall be invited to attend meetings pertaining to their responsibilities.".

Technical and Conforming Amendments to National Security Presidential Directive-8 (NSPD-8)

(22) NSPD-8 ("National Director and Deputy National Security Advisor for Combating Terrorism") is amended by striking "and the Office of Homeland Security," on page 4, and inserting "the Department of Homeland Security, and the Homeland Security Council" in lieu thereof.

Technical and Conforming Amendments to Homeland Security Presidential Directive-2 (HSPD-2)

(23) HSPD-2 ("Combating Terrorism Through Immigration Policies") is amended as follows:

(a) striking "the Commissioner of the Immigration and Naturalization Service (INS)" in the second sentence of the second paragraph in section 1, and inserting "the Secretary of Homeland Security" in lieu thereof ;

(b) striking "the INS," in the third paragraph in section 1, and inserting "the Department of Homeland Security" in lieu thereof;

(c) inserting ", the Secretary of Homeland Security," after "The Attorney General" in the fourth paragraph in section 1;

(d) inserting ", the Secretary of Homeland Security," after "the Attorney General" in the fifth paragraph in section 1;

(e) striking "the INS and the Customs Service" in the first sentence of the first paragraph of section 2, and inserting "the Department of Homeland Security" in lieu thereof;

(f) striking "Customs and INS" in the first sentence of the second paragraph of section 2, and inserting "the Department of Homeland Security" in lieu thereof;

(g) striking "the two agencies" in the second sentence of the second paragraph of section 2, and inserting "the Department of Homeland Security" in lieu thereof;

(h) striking "the Secretary of the Treasury" wherever it appears in section 2, and inserting "the Secretary of Homeland Security" in lieu thereof;

(i) inserting ", the Secretary of Homeland Security," after "The Secretary of State" wherever the latter appears in section 3;

(j) inserting ", the Department of Homeland Security," after "the Department of State," in the second sentence in the third paragraph in section 3;

(k) inserting "the Secretary of Homeland Security," after "the Secretary of State," in the first sentence of the fifth paragraph of section 3;

(l) striking "INS" in the first sentence of the sixth paragraph of section 3, and inserting "Department of Homeland Security" in lieu thereof;

(m) striking "the Treasury" wherever it appears in section 4 and inserting "Homeland Security" in lieu thereof;

(n) inserting ", the Secretary of Homeland Security," after "the Attorney General" in the first sentence in section 5; and

(o) inserting ", Homeland Security" after "State" in the first sentence of section 6.

Technical and Conforming Amendments to Homeland Security Presidential Directive-3 (HSPD-3)

(24) The Homeland Security Act of 2002 assigned the responsibility for administering the Homeland Security Advisory System to the Secretary of Homeland Security. Accordingly, HSPD-3 of March 11, 2002 ("Homeland Security Advisory System") is amended as follows:

(a) replacing the third sentence of the second paragraph entitled "Homeland Security Advisory System" with "Except in exigent circumstances, the Secretary of Homeland Security shall seek the views of the Attorney General, and any other federal agency heads the Secretary deems appropriate, including other members of the Homeland Security Council, on the Threat Condition to be assigned."

(b) inserting "At the request of the Secretary of Homeland Security, the Department of Justice shall permit and facilitate the use of delivery systems administered or managed by the Department of Justice for the purposes of delivering threat information pursuant to the Homeland Security Advisory System." as a new paragraph after the fifth paragraph of the section entitled "Homeland Security Advisory System."

(c) inserting ", the Secretary of Homeland Security" after "The Director of Central Intelligence" in the first sentence of the seventh paragraph of the section entitled "Homeland Security Advisory System".

(d) striking "Attorney General" wherever it appears (except in the sentences referred to in subsections (a) and (c) above), and inserting "the Secretary of Homeland Security" in lieu thereof; and

(e) striking the section entitled "Comment and Review Periods."

GEORGE W. BUSH

# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| ADA | Americans with Disabilities Act |
| CIA | Central Intelligence Agency |
| EOC | Emergency Operation Center |
| FAA | Federal Aviation Admministration |
| FBI | Federal Bureau of Investigation |
| FEMA | Federal Emergency Management Act |
| ICS | Incident Command System |
| IRA | Irish Republican Army |
| IRT | Interborough Rapid Transit |
| MTA | Metropolitan Transportation Authority |
| NIMS | National Incident Management System |
| NYC | New York City |
| NYPD | New York City Police Department |
| OEM | Office of Emergency Management |
| PATH | Port Authority Trans Hudson |
| WTC | World Trade Center |

# SOURCES

Interviews were conducted with officials from the New York City Office of Emergency Management, New York City Health Department, New York City Police Department, NYPD Transit Bureau, MTA, New York City Transit, MTA Police Department, Port Authority of New York and New Jersey, PATH, and Port Authority Police Department. In addition, the following presentations and reports were used.

American Public Transportation Association. "America Under Threat: Transit Responds to Terrorism," special supplement to *Passenger Transport*. December 10, 2001.

Crawford, Cosema, PE, Vice President and Chief Engineer, Capital Programs Management, New York Transit Authority. "Rebuilding After 9-11." Undated.

McKinsey & Company. *Improving NYPD Emergency Preparedness and Response*. August 19, 2002.

MTA - New York City Transit. "WTC Incident Chronology." Undated.

_____. "A Brief Look at 9-11-01." Undated presentation.

_____. "The Day That Shook Our World." Special issue of *At Your Service*, October/November 2001.

_____. "Our Finest Hour: September 11 One Year Later." Special issue of *At Your Service*, September 2002.

O'Hare, Francis M., Operations Commander, Transit Bureau NYPD. "MTA-NYC Transit Response to Terrorism." Undated.

Reuter, Lawrence G., President, New York City Transit. "Terrorist Attack: Response and Prevention." Remarks at the APTA Annual Conference, Las Vegas, September 23, 2002.

_____. "Post 9-11: Rebuilding Transit Services in Lower Manhattan." Remarks at the APTA Annual Conference, Las Vegas, September 24, 2002.

Siano, Joseph N., PE. "Restoration of Passenger Transportation to Lower Manhattan." Presentation to American Society of Civil Engineers, North Jersey Branch, The Newark Club, February 21, 2002.

Trainor, Joseph F., PE, Program Manager, Station Complexes, Elevators and Escalators, New York City Transit Authority. "Rebuilding the NYC Transit System Post 9-11." May 2002, New York City.

U.S. Department of Transportation, John A. Volpe National Transportation Systems Center. *Effects of Catastrophic Events on Transportation System Management and Operations: A Cross Cutting Study*. January 2003.

# ABOUT THE AUTHORS

## BRIAN MICHAEL JENKINS

Brian Michael Jenkins is one of the world's foremost authorities on terrorism and sophisticated crime. He works with government agencies, international organizations and multinational corporations as an analyst, investigator, and crisis management consultant. From 1989 to 1998, Mr. Jenkins was the Deputy Chairman of Kroll Associates, an international investigative and consulting firm. Before that, he was chairman of RAND's political science department, where from 1972 to 1989, he also directed RAND's research on political violence. He is currently a senior advisor to the president of RAND.

Jenkins has BA in Fine Arts and a Master's degree in History, both from UCLA. He studied at the University of Guanajuato in Mexico and in the Department of Humanities at the University of San Carlos in Guatemala, where he was a Fulbright Fellow and recipient of a second fellowship from the Organization of American States.

Commissioned in the infantry at the age of 19, Mr. Jenkins became a paratrooper and ultimately, a Captain in the Green Berets. He is a decorated combat veteran, having served in the Seventh Special Forces Group in the Dominican Republic during the American intervention and later as a member of the Fifth Special Forces Group in Vietnam (1966-1967). He returned to Vietnam on a special assignment in 1968 to serve as a civilian member of the Long Range Planning Task Group; he remained with the group until the end of 1969, receiving the Department of the Army's highest award for his service. Mr. Jenkins returned to Vietnam in 1971 on a special assignment.

Mr. Jenkins is the author of *International Terrorism: A New Mode of Conflict*, the editor and co-author of *Terrorism and Personal Protection*, co-editor and co-author of *Aviation Terrorism and Security*, and co-author of *The Fall of South Vietnam*. He is also the author of numerous articles, book chapters, and published research reports on conflict and crime.

In 1996, President Clinton appointed Mr. Jenkins to be a member of the White House Commission on Aviation Safety and Security. From 1999 to 2000, he served as an advisor to the National Commission on Terrorism and in 2000 was appointed to be a member of the U.S. Comptroller General's International Chamber of Commerce (ICC) and a member of the board of directors of the ICC's Commercial Crime Services. Mr. Jenkins was also a member of the Transportation Research Board/National Research Council Panel on Transportation: Science and Technology for Countering Terrorism, 2002.

Mr. Jenkins has led the Mineta Transportation Institute's counter-terrorism research team since 1997, producing three volumes of case studies of major terrorist attacks on surface transportation

and participatiing in symposia to disseminate best practices distilled from lessons learned in the attacks.

**FRANCES EDWARDS-WINSLOW, PH.D., CEM**

Frances Edwards-Winslow is a nationally known leader in emergency management, especially in terrorism preparedness, as the Director of the San Jose Metropolitan Medical Task Force. She was recognized as Public Official of the Year 2002 by *Governing Magazine* for her leadership in terrorism preparedness. She was also recoginzed as one of the Power 100 of the Silicon Valley by *San Jose Magazine*. Shortly after the tragedy of 9-11, San Jose was named best prepared city in articles in the *Wall Street Journal*, *New York Times*, *Christian Science Monitor*, and other national publications. The overall preparedness program was featured on MSNBC and was the model of 21st century civil defense on The History Channel.

Ms. Edwards-Winslow is also Director of Emergency Preparedness for the City of San José, CA. She is responsible for San Jose's Office of Emergency Services, including public education programs regarding terrorism preparedness, as well as natural and technological disasters that may occur in the community. OES also maintains the City's Emergency Operations Plan, Emergency Operations Center, and coordinates the RACES and CERT programs of the city, involving over 1,000 volunteers.

Ms. Edwards-Winslow represented emergency management on the five night "Bio War" series on *Nightline with Ted Koppel* in 1999. She is a a published author in terrorism studies, a frequent speaker at conferences and training events, including Mineta Transportation Institute symposia. She is a member of the Executive Session on Domestic Preparedness at Harvard University, the Bioterrorism Working Group at Stanford University, and the National Academy of Sciences Institute of Medicine Metropolitan Medical Task Force Evaluation Committee.

Winslow teaches emergency management courses and public administration courses at various universities, including graduate courses at San José State University and Santa Clara University. She was a faculty member of the Political Science Department at Kean College of New Jersey, where she developed the Public Administration Program. She holds degrees from Drew University (BA and MA) and New York University (MUP and Ph.D.) and a certificate in Hazardous Materials Materials Management from University of California at Irvine. She is a Certified Emergency Manager (CEM).

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